

Total No. of Questions : 8]

SEAT No. :

**P3932**

[4760]-77

[Total No. of Pages : 3

**M.E. (Civil) (Water Resources and Environmental Engg.)**

**GROUND WATER CONTAMINATION AND TRANSPORT**

**(2012 Course) (Semester - I) (Elective - I)**

*Time : 3 Hours]*

*[Max. Marks :100*

*Instructions to the candidates:*

- 1) *Answers to the two sections should be written in separate answer books.*
- 2) *Attempt any three questions from each sections.*
- 3) *Neat diagrams must be drawn wherever necessary.*
- 4) *Figures to the right side indicate full marks.*
- 5) *Use of calculator is allowed.*
- 6) *Assume suitable data if necessary.*
- 7) *Use data sheet.*

**SECTION - I**

- Q1)** a) Explain what are the source of Pollution for G.W.? [8]
- b) Derive a general steady state continuity equation for G.W. flow in heterogeneous anisotropic aquifer. [8]
- Q2)** a) Explain in detail various factors that affect fluctuating in GW levels.[10]
- b) Explain the procedure for drawing flow net using [8]
- i) Graphical method
  - ii) Numerical solution
- Q3)** a) Explain with suitable sketch: Well interference. [8]
- b) Trace injected into a well took 4 hours to travel up to another well 50 m apart. The difference in water surface elevation was found to be 1.0m the aquifer sample indicated a porosity of 30%. Determine the following [8]
- i) Permeability
  - ii) Seepage velocity
  - iii) Reynold's no.of flow

**P.T.O.**

**Q4) a)** Obtain an expression for discharge through a flow net for an isotropic aquifer. [8]

b) Explain piezometer test pumping. [8]

**SECTION - II**

**Q5) a)** What is meant by groundwater pollution control? Explain vyredox method for in situ chemical treatment of groundwater. [8]

b) What are various method of treatment of organic matter in ground water Explain any on method with its application & cost economics. [10]

**Q6) a)** Assume that three piezometer are installed very close to each other but penetrate up to different depth as given below: [8]

Piezometer	A	B	C
Elevation at surface (mtr)	500	500	500
Depth of piezometer (mtr)	150	110	50
Depth of water (mtr)	27	47	36

Let A, B, and C Refer to the point of measurement of piezometer a, b and c respectively, calculate:

- i) GW heat at a, b and c in meters.
- ii) Pressure head at a, b and c in meter.
- iii) Fluid pressure at B in N/m<sup>2</sup>.

b) Explain following terms [8]

- i) Aquifer
- ii) Aquiclude
- iii) Aquifuge
- iv) Aquitard

- Q7)** a) Discuss in briefly hydrochemical facies in GW contamination and explain its utility. [8]
- b) Explain how the rock forms affects the GW availability wrt following rock type [8]
- i) Carbonate terrain
  - ii) Crystalline rock
  - iii) Complex sedimentary system
- Q8)** a) What is the utility of GW investigation? Explain seismic refraction and reflection method of GW investigation. [8]
- b) Enlist any 4 methods of GW recharge. Explain any one in details. [8]

*EEE*